UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,638	08/19/2005	Palani Balaya	MFA-18802/04	9536

25006 7590 01/20/2010

GIFFORD, KRASS, SPRINKLE,ANDERSON & CITKOWSKI, P.C
PO BOX 7021
TROY, MI 48007-7021

EXAMINER	
LEWIS, BEN	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
01/20/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,638	BALAYA ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/18/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Requirement for restriction is withdrawn by Examiner. All claims 1-11 were examined

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 9 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Kweon et al. (U.S. Patent No. 6,756,155 B1).

With respect to claims 1-3, 9 and 11, Kweon et al. disclose a positive active material for rechargeable lithium batteries (title) wherein the active materials contains a compound comprised of Formula (1) i.e. $LiCoA_2$ wherein A can be fluorine (Column 3, lines 11-24).

Kweon et al. teach polyvinylidienefluoride as binder (PVDF) and Super P carbon (carbon black) as conductive agent

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kweon et al. (U.S. Patent No. 6,756,155 B1). in view of Yoshida et al. (U.S. Pub. No. 2002/0102464 A1).

With respect to claim 10, Kweon et al. disclose rechargeable lithium battery above. Kweon et al. does not specifically teach a supercapacitor. However, Yoshida et al. disclose a polymer gel electrolyte secondary cell and electrical double layer capacitor (title) wherein the capacitor contains conductive material, binder and lithiathed cobalt oxide active material (Paragraph 0382). Therefore it would have been obvious to one of ordinary skill in the art to incorporate the lithiated active material of Kweon et al. into the capacitor of Yoshida et al. because Kweon et al. teach that thermal stability is improved Col 7 ines 5-15). Yoshida et al. reference is considered analogous art because they both apply to the same problem solving area of providing lithiated active material based electrodes for energy storage devices.

5. Claims 4, 5, 6, 7, 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al. (U.S. Pub. No. 2004/0214084 A1) in view of Yoshizawa et al. (U.S. Pub. No. 2002/0192551 A1).

With respect to claim 1, Barker et al. disclose synthesis of metal compounds under carbothermal conditions (title), wherein the products of the method find use in lithium ion batteries as cathode active materials. Preferred active materials include lithium-transition metal phosphates and lithium-transition metal oxides (Paragraph 0010).

With respect to an LiX-M amorphous composite or nano-composite, Barker et al. teach that Phosphate active materials or active materials where other anions may completely or partially replace phosphate may be represented by the general formula: $A_aM_b(XY_4)_cZ_d$, (Paragraph 0024).

(a) A is selected from the group consisting of Li, Na, K, and mixtures thereof, and $0<a<=8$;

(b) M comprises one or more metals, comprising at least one metal which is capable of undergoing oxidation to a higher valence state, and $1<=b<=3$;

(c) $0<c<=3$;

(d) Z is OH, halogen, or mixtures thereof, and $0<=d<=6$; and

wherein M, X, Y, Z, a, b, c, d, x and y are selected so as to maintain electroneutrality of the compound (Paragraph 0024 – 0030)

(Examiner notes that when A= Li and c=0 the formula of Barker et al. reads on Applicants formula of LiX-M).

Barker et al. also teach that in a preferred embodiment, M comprises two or more transition metals from Groups 4 to 11 of the Periodic Table. In another preferred embodiment, M comprises M'M", where M' comprises at least one transition metal from Groups 4 to 11 of the Periodic Table; and M" at least one element from Groups 2, 3, 12, 13, or 14 of the Periodic Table. Preferred embodiments include those where c=1, those where c=2, and those where c=3. Preferred embodiments include those where a 1 and c=1, those where a=2 and c=1, and those where a 3 and c=3. Preferred embodiments also include those having a structure similar to the mineral olivine (herein "olivines"), and those having a structure similar to NASICON (NA Super Ionic Conductor) materials (herein "NASICONs") (Paragraph 0031).

Barker et al. teach that transition metals useful herein include those selected from the group consisting of Ti (Titanium), V (Vanadium), Cr (Chromium), Mn (Manganese), Fe (Iron), Co (Cobalt), Ni (Nickel), Cu (Copper), Zr (Zirconium), Nb (Niobium), Mo (Molybdenum), Ru (Ruthenium), Rh (Rhodium), Pd (Palladium), Ag (Silver), Cd (Cadmium), Hf (Hafnium), Ta (Tantalum), W (Tungsten), Re (Rhenium), Os (Osmium), Ir (Iridium), Pt (Platinum), Au (Gold), Hg (Mercury), and mixtures thereof (Paragraph 0039).

With respect to X being fluorine, Barker et al. teach that Z is OH, halogen, or mixtures thereof. In one embodiment, "d" is equal to zero. In another preferred embodiment, d is non-zero and Z is selected from the group consisting of OH (hydroxyl), F (fluorine), Cl (chlorine), Br (bromine) and mixtures thereof. In a preferred embodiment, Z is OH. In another preferred embodiment, Z is F, or mixtures of F with OH, Cl, or Br. Preferably "d" is from about 0.1 to about 6, more preferably from about 0.2 to about 6. Where c=1, d is preferably from about 0.1 to about 3 (Paragraph 0044).

With respect to the transition metal being metal clusters Barker et al. teach that the presence of carbon particles in the starting materials is thought to provide nucleation sites for the production of the product crystals. The reaction product is believed to be comprised of small grains or crystals nucleated onto carbon particles. The individual grains are agglomerated (clusters). This provides many advantages, including the enhanced conductivity of the product (Paragraph 0067).

With respect to conductive additive, Barker et al. teach the use of graphite and carbon black and metal particles (Paragraph 0131-0132).

With respect to binders, Barker et al. teach the use of PVDF (Paragraph 0132). Barker et al. also teach that in another aspect, reaction of a metal compound and a source of carbon is carried out without simultaneous reduction of a metal. In this aspect, the metal compounds are provided in an oxidation state equal to their oxidation state in the desired product. Whether or not reaction proceeds with carbothermal reduction, the carbon particles preferably provide nucleation sites for the crystals of the reaction product. The crystals or grains thus produced are preferably smaller than they

would be in the absence of the carbon. The smaller grain size preferably leads to more intimate packing of the crystals forming a high quality active material. Preferably, carbon particles are also dispersed throughout the reaction product, leading to a product with good conductivity between grains. This is believed to contribute to the high quality of the active material made under carbothermal conditions (Paragraph 0020).

Barker et al. disclose lithium batteries having positive and negative electrodes and electrolyte (Paragraph 0002). Barker et al. teach that the polymer electrolyte matrix comprises a salt typically organic and a solvent. The solvent relatively non-volative, aprotic, relatively polar solvent (Paragraph 0152).

Barker et al. do not specifically teach a nano composite. However, Yoshizawa et al. disclose a nonaqueious electrolyte battery wherein, by using the iron compound of which primary particles is substantially a pore-free matter in nano particle region, occlusion and release of lithium in the 4 V region, which were hitherto difficult, are easy, and a stable charging or discharging is possible. When particles are in nano particle region, the number of constituent atoms in particle is extremely small, and band structure is hardly formed, so that the energy level of electrons becomes discrete. As a result, electrons can be given and taken relatively easily, so that occlusion and release of lithium ions seem to be improved (Paragraph 0017). Therefore it would have been obvious to one of ordinary skill in the art to use the nano particle size of Yoshizawa et al. as the size of the electrode active material of Barker et al. because Yoshizawa et al.

teach that electrons can be given and taken relatively easily, so that occlusion and release of lithium ions seem to be improved (Paragraph 0017).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ben Lewis/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795